Sandia National Laboratories

Acoustic Cell Lysing for Efficient DNA Extraction

BENEFITS

- Short wavelength acoustic waves in a channel efficiently stress and break cells to release DNA
- No harsh chemicals; purification needed: **PCR-ready DNA**
- Efficient recovery (~50%) of DNA from tiny sample volumes

APPLICATIONS

- Medicine: same-day pathogen diagnosis
- Species-specific drug prescriptions
- Lysing of resilient cells (e,g. TB)
- Security: bio-agent identification
- Rapid DNA evidence testing

US PATENT PENDING ON SANDIA DISCLOSURE#

- 11592

INTELLECTUAL PROPERTY & LICENSING CONTACT

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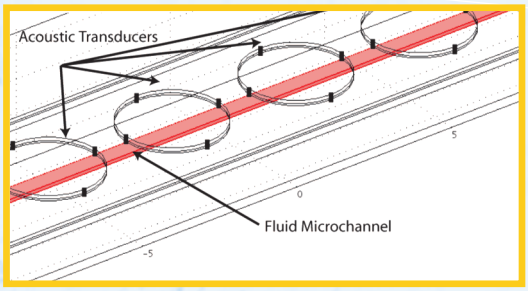
Summary

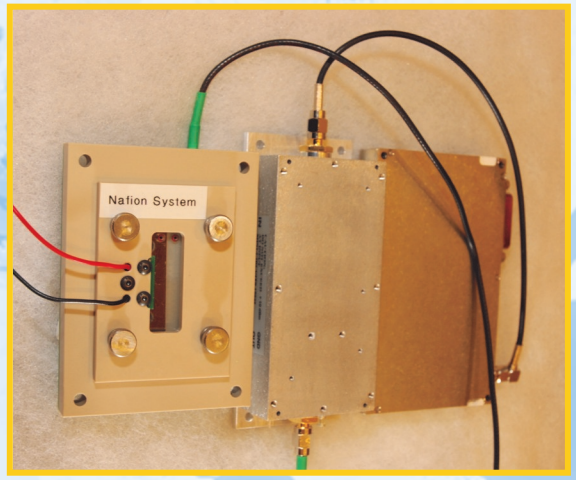
A CHALLENGE FOR DNA TESTING:
Extracting DNA from cells for testing and analysis can require the use of harsh chemicals, which means additional purification (up to several days) before amplification using PCR can be safely performed.



A novel microchannel-based high frequency acoustic wave device uses sonic energy to quickly lyse cells and release nucleic acids.

Sandia researchers responded by developing a system for extracting and collecting DNA without chemicals, enabling rapid diagnosis applications.

This breakthrough acoustic streaming technology uses ultra high frequency (>50 MHz) sonic energy in a microchannel to burst cells and release DNA, making chemical treatment unnecessary and saving days of purification time.



Complete microfluidic acoustic cell lysing and nucleic acid extraction system.

The in-line microfluidic processing recovers the nucleic acids for PCR amplification and type-testing with efficiency greater than 50%, making this solution attractive for high value, small volume samples, as well as field work. The cell lysis unit can also be used for amino acid recovery.

Licensing & Partnering Status:

Various license and partnering options are available. Please contact the Intellectual Property department to discuss.

Technology Readiness Level:

Sandia estimates the technology readiness level at approximately 4-5. It has been established that the key elements work together in the laboratory environment and are expected to perform similarly in application-specific environments.

National Nuclear Security Administration

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